

## Quality of life and associated factors in elderly people at a Reference Center

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**Abstract** *Studies have evaluated the quality of life (QOL) of many groups; however, such studies in relation to Reference Centers for the Elderly are scarce. This research identified factors associated with a good QOL of people using a Reference Center in the city of Belo Horizonte, MG, Brazil. Transversal study of 257 elderly people who used a Reference Center for the Elderly. The short version of the World Health Organization Quality of Life Assessment (WHOQOL-BREF) was used to evaluate the QOL of the elderly people. The analysis was rationalized by defining two groups in relation to perceptions of QOL and satisfaction regarding health. Logistic regression analysis was performed to assess the direction and magnitude of the association of each variable with QOL. The results showed that the majority (63.4%) of the elderly people considered that they had a good QOL and that they were satisfied with their health. The environmental domain received the lowest scores (average = 14.4). The factors of advanced age, being from the interior of the state of Minas Gerais, physical activity, diabetes, musculoskeletal diseases, hypertension and depression remained independently associated with QOL and satisfaction with health after the model was adjusted. The data that was obtained can be used to direct care strategies for the most vulnerable elderly people, with particular attention to issues that affect the environment.*

**Key words** *Aging population, Quality of life, Transversal studies*

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## Introduction

Population aging is a global phenomenon that is mainly due to a decline in mortality and fertility rates. Demographic projections indicate that the number of elderly people aged over 60 will exceed the number of children for the first time in 2047, growing from 841 million elderly people in 2013 to over 2 billion in 2050<sup>1</sup>.

According to the Brazilian Census in 2010, the number of elderly exceeded 20 million people and a factor of particular note was the proportional and faster increase of the group referred to as “very old” (over 80). This age group is currently the fastest growing population segment and it now represents more than 14.2% of the elderly population<sup>2</sup>.

In this populational macro environment, rapid demographic transition has occurred most sharply in developing countries and it has been accompanied by epidemiological changes. Complex changes have been observed in health-disease models, which have changed from a prevalence of communicable diseases to a higher prevalence of chronic non-communicable diseases (NCDs)<sup>3</sup>.

As a result of NCDs such as diabetes, cardiovascular disease and strokes, it has been estimated that decreased productivity at work and reduced household income will lead to a loss to the Brazilian economy of billion dollars. The strong socioeconomic impact of chronic diseases and their risk factors are having a negative effect on the Millennium Development Goals, which cover topics such as health, education and the reduction of poverty, and according to a study produced by the Pan American Health Organization and the World Health Organization this is to be found in most countries<sup>4</sup>.

Transposing these demographic and epidemiological factors, the intensification of changing age structures and the increase in NCDs also results in a direct effect on the QOL of individuals.

As part of the growing body of scientific evidence that exists in relation to these issues, international studies have shown an inverse correlation between QOL and fragility<sup>5</sup>, depression<sup>6</sup>, and institutionalization<sup>7</sup>, which have been represented as factors of vulnerability and have resulted in low scores for the QOL of elderly people, however, physical activity<sup>8</sup> and social support<sup>9</sup> contribute positively in the various QOL domains.

In contrast, Brazilian studies regarding the assessment of the status of the QOL of very elderly people are incipient and have also been performed with different instruments, which mean that it is difficult to compare data<sup>10-12</sup>.

It is important to bear in mind that demographic transition has resulted in the need to create assistance programs for the elderly in order to provide active aging and to maintain the QOL of this segment of the population.

Successful international example of initiatives aimed at improving the QOL of the elderly can be found in Canada, Spain, Italy, Portugal and Germany. The latter include programs such as “Active Living” (Alberta, Canada), “In Porto Life is Long” (Porto, Portugal) and “Wellness Project” (Terranuova, Italy), all of which demonstrate that it is possible to promote healthy aging<sup>13</sup>.

Initiatives by the Federal Government in favor of the elderly in Brazil began in the 1970s; however, the first national policy for this age group was only implemented in 1994. The National Policy for the Elderly (PNI) was enacted in 1994 and it was regulated by Decree No. 1948 of June 3, 1996, which ensured the social rights of the elderly<sup>14,15</sup>. In addition, Ordinance No. 1395/GM created the Health Policy for the Elderly, which is designed to promote healthy aging, as well as the improvement and/or maintenance of the maximum functional capacity in order to ensure that elderly people can remain independent in the environment in which they live<sup>14</sup>.

In 2003, Law No. 10.741 created the Statute for the Elderly, which aims to provide facilities and opportunities for the preservation of physical and mental health, as well as improvements in the moral, spiritual, intellectual and social conditions of the elderly<sup>16</sup>.

In 2006, the Guidelines for the Pact for Health were implemented through Ordinance/GM No. 399. These guidelines addressed the following three dimensions: the Pact for Life; the Pact in Defense of the SUS; and the Management Pact. The health of the elderly is one of the main priorities for the Pact for Life because of the demographic dynamics of Brazil<sup>17</sup>.

All policies aimed at the elderly should take into account factors such as functional capacity, as well as the need for autonomy, participation, care and self-satisfaction. Furthermore, such policies should fundamentally encourage comprehensive health prevention and care that is based on QOL and active aging<sup>18</sup>.

Given the aforementioned, this study examined the factors which contributed to maintaining the quality of life of elderly people attending a reference center in the city of Belo Horizonte, Brazil. This study was intended to expand the existing knowledge about this issue and to encourage the design of actions and interventions to have an effective impact on care policies for the

elderly which are designed to provide improvements in health care and QOL.

Thus, this study identified factors associated with the quality of life of individuals attending a Reference Center for the Elderly in the city of Belo Horizonte, Minas Gerais, Brazil by using the short version of the World Health Organization Quality of Life Assessment (WHOQOL-BREF).

## Method

This was a transversal study of 257 people, aged 60 or over, who were registered and active in the various programs provided by a Reference Center for the Elderly (CRPI) in the city of Belo Horizonte, Minas Gerais, Brazil.

This particular CRPI is a public facility that belongs to the city of Belo Horizonte. It offers services and programs aimed at promoting the health of elderly people, as well as preventing social isolation and protecting their rights. The scope of activities that are offered include a gym, ballroom dancing, Gypsy dancing, singing, Lian Gong, computer training, painting on fabric and screen, Biodanza, a youth and adults education project (EJA), "Active Life" and a talent show. The center currently has 590 elderly users who perform various social and educational activities.

The sample size was calculated using the Lwanga & Lemeshow formula<sup>19</sup>, which requires the following information: a) the proportion of the population; b) the significance level and c) absolute accuracy. The sample size calculation was based on the proportion of 79.0% of elderly Brazilians whose self-perception of their QOL was satisfactory<sup>20</sup>, with a 5% significance level and absolute precision of five percentage points. The sample size was 255 elderly people. Taking into account 5.0% possible losses, the final sample included 268 elderly people.

In total, data were collected from 269 elderly people, which were reviewed one by one. Of these, there were twelve losses - five due to the fact that the WHOQOL-BREF instrument contained more than 20.0% of questions that were not completed - and seven because the participants were aged under 60. Consequently, taking into account the sample losses, there were 257 completed and analyzed questionnaires (95.9% of the calculated sample). No participant was excluded from the sample due to severe cognitive impairment ( $24.8 \pm 4.2$ ).

The inclusion criteria were as follows: men and women aged over 60 who were registered at the Reference Center, and who frequented the

center, who agreed to participate in the survey and answered the questionnaire.

Elderly people with severe cognitive impairment (who scored  $\leq 9$  on the Mini-Mental State Examination - MMSE) that prevented them answering the questionnaire were excluded from the study<sup>21</sup>.

Data collection began in January 2012 in the Reference Center. Due to works being undertaken on site, data collection was suspended in August 2012. Data collection resumed in November 2013 and continued until May 2014. The data collection was performed by a previously trained team that was composed of three individuals receiving a fellowship from Scientific Initiation and one person studying for a Master's degree in nursing. The team was supervised by members of the Center for Studies and Research in Health and Human Development (NEPCDH) of the Federal University of Minas Gerais. The participants in the study were approached by interviewers while waiting for activities in the Reference Center in the morning and afternoon sessions, depending on the availability of each interviewer.

A pre-test questionnaire was conducted in order to check inconsistencies in the questions and any difficulties in understanding by the participants. There was no difficulty in understanding the questions by the participants and the data were not incorporated into the study.

The information was obtained through a structured questionnaire that was organized into the following thematic blocks: socio-demographic variables (gender, age, place of birth, marital status, education and family income); clinical variables (number of comorbidities, self-reported comorbidities, cognitive function, depression and body mass index - BMI); and lifestyle variables (alcohol consumption, smoking, physical activity) and quality of life.

In order to assess the subjective perception of QOL we used the short version of WHOQOL-BREF in Portuguese. This instrument has shown a good response to analyzing the QOL in the elderly<sup>22-24</sup> and it was translated and validated in Brazil<sup>25</sup>. The WHOQOL-BREF includes 26 items; the first two questions assess the self-perceived quality of life and satisfaction with the person's health. The remaining 24 questions were categorized in the following four domains: physical (7 items); psychological (6 items); social relationships (3 items) and environment (8 items)<sup>26</sup>. Each of these 26 items was assigned scores that ranged from 1 to 5. The score for each domain was transformed into a linear scale from 0 to 100 according to the syntax proposed by the WHO-

QOL group<sup>27</sup>, reflecting a better or worse assessment of QOL.

There were no cut-offs to determine scores below or above what could be evaluated as a “bad” or “good” QOL. Thus, it was decided to rationalize the analysis by defining two groups in relation to the perception of QOL and satisfaction with health. Group 1 was defined as: satisfactory/good QOL; self-reported QOL as being “good” or “very good” and feeling “satisfied” or “very satisfied” with their health. Group 2 was defined as: unsatisfactory/bad QOL; self-reported QOL as being “bad”, “very bad” or “neither bad nor good”; and feeling “unsatisfied”, “very unsatisfied” or “neither satisfied nor dissatisfied” with their health.

The parameters set by the BMI classification followed the cut-offs established for elderly individuals i.e. low weight: < 22 kg/m<sup>2</sup>; eutrophic: 22-27 kg/m<sup>2</sup>; and overweight: > 27 kg/m<sup>2</sup><sup>28</sup>.

The presence of depression was assessed using the Patient Health Questionnaire-2 (PHQ-2). For this study, the cut-off point of  $\geq 3$  was adopted (sensitivity: 83%; specificity: 92%), which, according to the literature, suggests probable depression<sup>29</sup>.

The Alcohol Use Disorders Identification Test-Consumption (AUDIT-C) was used to evaluate the consumption of alcoholic beverages. Based on a previous validation study, a score of  $\geq 4$  for men and  $\geq 3$  for women suggested alcohol abuse and was adopted as a criterion in this study<sup>30</sup>.

The data were entered and analyzed using the Statistical Package for the Social Sciences (version 22.0). In the descriptive statistics the continuous variables were compared between groups using the Student's t-test for independent samples or the analysis of variance test (parametric ANOVA with a classification criterion), which was supplemented where necessary by Tukey's test. The categorical variables were compared using Pearson's chi-square test ( $\chi^2$ ) or Fisher's exact test. In the statistical modeling, a critical level value of  $p \leq 0.20$  was adopted for entry in the multivariate model. The analysis of the normality of the continuous variables was performed using the Kolmogorov-Smirnov test. The Spearman's-Rho correlation test was used for the overall QOL (OQOL) and QOL/satisfaction with health groups; it was also performed for the WHOQOL-BREF domains. The logistic regression model using the Forward method was

designed to assess the direction and magnitude of the association of each independent variable with the response variable (good QOL/satisfied with health). In this analysis,  $p < 0.05$  was considered as statistically significant. The values that were obtained were expressed as odds ratios and their 95% confidence intervals. The adjustment of the final model was evaluated by the goodness-of-fit test.

## Results

### Characteristics of the individuals

Some of the general characteristics of the study sample are shown in Table 1. The average age of the participants was  $70.8 \pm 6.4$  years and 82.5% were female. The majority came from the interior of the state of Minas Gerais (60.9%), and 63.8% did not have a spouse. In terms of education, 8.6% of the elderly did not attend school; 21.4% had zero or less than four years of study. In relation to employment and income, it was found that 22.6% of the elderly people were currently working and 80.2% were retired. It is noteworthy that 11.7% of pensions were due to disability. The monthly income of this sample was low and most received 19.1% less than the minimum wage. Only 9.7% of the elderly people reported an absence of illness and 33.0% reported more than three comorbidities. The most common comorbidities were hypertension (63.4%), dyslipidemia (26.5%), diabetes (23.7%) and osteoarticular diseases (23.3%). Altered cognitive level was detected in 16.7% of the sample. The depressive symptoms index obtained a median of zero (IQ 0-2.0) and 9.7% received a sum of the scores (total PHQ) equal to or more than three points. Among those who were potentially depressed, 3.5% had a score of six points, indicating more serious problems. Regarding nutritional status, half of the sample was overweight and 11.6% were underweight. In terms of behavioral habits, 9.5% of the elderly had a diagnosis of probable alcoholism; 3.9% of respondents currently smoked; 45.7% reported smoking or having smoked more than 10 cigarettes per day, and approximately 75% of the elderly reported having smoked for more than 10 years. Regarding physical activity, 8.9% did not exercise. Walking was the most common form of exercise and 67.7% of those who performed physical activity said that they walked.

**Table 1.** Characteristics of the study sample according to quality of life (QOL) and satisfaction with health groups at a Reference Center for the Elderly, Belo Horizonte, Minas Gerais, Brazil from 2012 to 2014 (n = 257)

Variables	Total (n = 257) n (%)	QOLand satisfaction with health				p-value <sup>a</sup>
		G1 (good) (n = 163)		G2 (bad) (n = 94)		
		n	%	n	%	
Gender						
Male	45 (17.5)	29	17.8	16	17.0	0.876
Female	212 (82.5)	134	82.2	78	83.0	
Age group(years)						
60-69	115 (44.7)	64	39.3	51	54.3	<b>0.025</b>
70-79	115 (44.7)	77	47.2	38	40.4	
≥ 80	27 (10.5)	22	13.5	5	5.3	
Place of birth*						
BH or MRBH	81 (31.6)	58	35.6	23	24.7	0.144
Interior of MG	156 (60.9)	92	56.4	64	68.8	
Other	19 (7.4)	13	8.0	6	6.5	
Marital status						
No spouse	164 (63.8)	102	62.6	62	66.0	0.587
Spouse	93 (36.2)	61	37.4	32	34.0	
Education (years)						
< 4	55 (21.4)	31	19.0	24	25.5	0.220
≥ 4	202 (78.6)	132	81.0	70	74.5	
Income (m.w) <sup>†</sup>						
< 1	48 (19.1)	29	18.0	19	21.1	0.342
1 + 3	101 (40.2)	62	38.5	39	43.3	
3 + 5	70 (27.9)	45	28.0	25	27.8	
≥ 5	32 (12.7)	25	15.5	7	7.8	
Comorbidities						
Arterial hypertension	163 (63.4)	91	55.8	72	76.6	<b>0.001</b>
Dyslipidemia	68 (26.5)	45	27.6	23	24.5	0.583
Diabetes	61 (23.7)	31	19.0	30	31.9	<b>0.019</b>
Musculoskeletal diseases	60 (23.3)	28	17.2	32	34.0	<b>0.002</b>
Thyroid gland diseases	41 (16.0)	23	14.1	18	19.1	0.288
Cardiac disease	27 (10.5)	12	7.4	15	16.0	<b>0.030</b>
Respiratory diseases	16 (6.2)	5	3.1	11	11.7	<b>0.006</b>
Cognitive level						
Altered	43 (16.7)	29	17.8	14	14.9	0.549
Preserved	214 (83.3)	134	82.2	80	85.1	
PHQ-2 total						
≥ 3	25 (9.7)	7	4.3	18	19.1	<b>&lt; 0.001</b>
< 3	232 (90.3)	156	95.7	76	80.9	
IMC (kg/m2) <sup>‡</sup>						
< 22	29 (11.6)	19	12.1	10	10.8	0.456
22-27	94 (37.6)	63	40.1	31	33.3	
> 27	127 (50.8)	75	47.8	52	55.9	
AUDIT-C <sup>§</sup>						
Negative	229 (90.5)	147	91.3	82	89.1	0.570
Positive	24 (9.5)	14	8.7	10	10.9	
Smoking						
Smoker	10 (3.9)	6	3.7	4	4.3	0.664
Non-smoker	165 (64.2)	108	66.3	57	60.6	
Ex-smoker	82 (31.9)	49	30.1	33	35.1	
Physical exercise						
4-7 times per week	72 (28.0)	55	33.7	17	18.1	<b>0.008</b>
1-3 times per week	162 (63.0)	98	60.1	64	68.1	
Never	23 (8.9)	10	6.1	13	13.8	

AUDIT-C: Alcohol Use Disorders Identification Test-Consumption; BH: Belo Horizonte; BMI: body mass index; MG: Minas Gerais; PHQ-2: The Patient Health Questionnaire-2; QOL: Quality of life; MRBH: metropolitan region of Belo Horizonte; m.w: minimum wage. <sup>†</sup>Variations in the n total due to missing values. <sup>a</sup>p-value: differences in the proportions (Pearson's chi-square test or Fisher's Exact test).

### Quality of life of the elderly according to WHOQOL-BREF

The average scores for QOL of the four domains of WHOQOL-BREF were as follows:  $63.91 \pm 9.62$  for the physical domain;  $64.05 \pm 10.83$  for the psychological domain;  $67.90 \pm 17.90$  for the social relationships domain; and  $14.44 \pm 1.96$  for the environmental domain. Regarding the overall score for QOL (OQOL), the average was  $52.57 \pm 7.74$  (Graph 1).

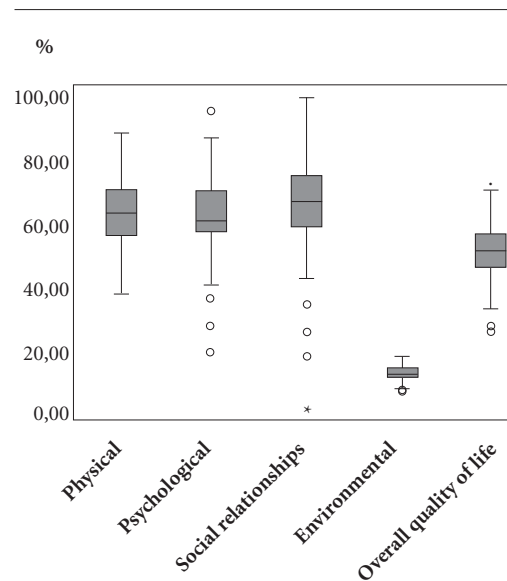
It was found that all the domains were significantly correlated with the OQOL. The least and the most correlated domains were environment ( $r = 0.622$ , moderate correlation,  $p < 0.001$ ) and social relationships ( $r = 0.842$ , strong correlation,  $p < 0.001$ ), respectively. However, when the correlation between the domains and the groups (G1 and G2) was verified there was a significant loss in relation to the physical domain ( $r = 0.098$ ,  $p = 0.116$ ). The social relationships domain correlated weakly ( $r = 0.241$ ,  $p < 0.001$ ) and the psychological domain ( $r = 0.408$ ,  $p < 0.001$ ) and environment domain ( $r = 0.432$ ,  $p < 0.001$ ) showed a moderate correlation.

Approximately 77.8% of the elderly perceived their QOL as good or very good and 3.1% as bad or very bad; 75.1% felt satisfied or very satisfied with their health, while 9.3% were unsatisfied or very unsatisfied.

Of the 200 elderly patients with a good or very good QOL, 81.5% were satisfied or very satisfied with their health and they formed the G1 group

(satisfactory/good QOL). The others made up the G2 group (bad/unsatisfactory QOL) (Table 2).

Table 3 shows that the scores for OQOL showed a linear trend, as the response was more positive, both in WHOQOL-1 and WHOQOL-2,



**Graph 1.** Box plot of the physical, psychological, social relationships, environmental, and overall quality of life domains. Reference Center for the Elderly, Belo Horizonte, Minas Gerais, Brazil from 2012 to 2014.

Note: OQOL-Overall quality of life.

**Table 2.** Frequency for the WHOQOL-1 and WHOQOL-2 variables for the QOL/satisfaction with health groups at a Reference Center for the Elderly, Belo Horizonte, Minas Gerais, Brazil from 2012 to 2014 (n = 257)

Variable	WHOQOL-2											
	Very unsatisfactory		Unsatisfactory		Neither satisfactory nor unsatisfactory		Satisfactory		Very satisfactory		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
WHOQOL-1												
Very bad	2 <sup>b</sup>	66.7	-	-	1 <sup>b</sup>	33.3	-	-	-	-	3	100
Bad	-	-	3 <sup>b</sup>	60.0	-	-	2 <sup>b</sup>	40.0	-	-	5	100
Neither bad nor good	1 <sup>b</sup>	2.0	8 <sup>b</sup>	16.3	12 <sup>b</sup>	24.5	27 <sup>b</sup>	55.1	1 <sup>b</sup>	2.0	49	100
Good	-	-	9 <sup>b</sup>	6.4	22 <sup>b</sup>	15.7	93 <sup>a</sup>	66.4	16 <sup>a</sup>	11.4	140	100
Very good	-	-	1 <sup>b</sup>	1.7	5 <sup>b</sup>	8.3	23 <sup>a</sup>	38.3	31 <sup>a</sup>	51.7	60	100
Total	3	1.2	21	8.2	40	15.6	145	56.4	48	18.7	257	100

WHOQOL: World Health Organization Quality of Life. <sup>a</sup>G1 –Good/satisfactory quality of life (n = 163). <sup>b</sup>G2 –Bad/unsatisfactory quality of life(n = 94).



**Table 3.** Scores for overall quality of life (OQOL) according to the variables WHOQOL-1, WHOQOL-2 and the QOL/satisfaction with health groups at a Reference Center for the Elderly, Belo Horizonte, Minas Gerais, Brazil from 2012 to 2014 (n = 257)

Variable	OQOL				
	Average	SD	CI 95%	p-value	p linear trend
WHOQOL-1 <sup>†</sup>					
Evaluation of QOL					
Very bad <sup>(a)</sup>	51.32	8.94	29.11 - 73.52	< 0.001 <sup>*</sup>	< 0.001
Bad <sup>(b)</sup>	41.86 <sup>(d,e)</sup>	11.59	27.46 - 56.25		
Neither bad nor good <sup>(c)</sup>	48.69 <sup>(d,e)</sup>	6.66	46.78 - 50.60		
Good <sup>(d)</sup>	52.32 <sup>(b,c,e)</sup>	6.89	51.17 - 53.48		
Very good <sup>(e)</sup>	57.29 <sup>(b,c,d)</sup>	7.42	55.37 - 59.20		
WHOQOL-2 <sup>†</sup>					
Satisfaction with health					
Very unsatisfactory <sup>(A)</sup>	47.93	8.99	25.61 - 70.26	< 0.001 <sup>*</sup>	< 0.001
Unsatisfactory <sup>(B)</sup>	47.43 <sup>(D,E)</sup>	7.30	44.11 - 50.75		
Neither satisfactory nor unsatisfactory <sup>(C)</sup>	50.19 <sup>(E)</sup>	5.08	48.57 - 51.81		
Satisfactory <sup>(D)</sup>	52.29 <sup>(B,E)</sup>	7.67	51.03 - 53.55		
Very satisfactory <sup>(E)</sup>	57.96 <sup>(B,C,D)</sup>	7.12	55.89 - 60.03		
QOL/satisfaction with health groups					
Good QOL/satisfactory health	54.60	7.64	53.42 - 55.78	< 0.001 <sup>**</sup>	-
Bad QOL/unsatisfactory health	49.06	6.60	47.71 - 50.41		

<sup>\*</sup> Parametric ANOVA with one classification criterion; <sup>†</sup> Significant differences between the averages of the groups (p < 0.05) are marked with superscript letters (Tukey's test); <sup>\*\*</sup> Student's t-test; ANOVA – Analysis of variance; SD – Standard deviation; CI 95% – 95% Confidence interval; QOL – Quality of life; OQOL – Overall quality of life; WHOQOL – World Health Organization Quality of Life.

which was statistically significant (p < 0.001). When the OQOL score was evaluated according to the groups defined by the analysis (G1 and G2) it was significantly higher in G1 (a better perception of QOL and greater satisfaction with health).

#### Factors associated with QOL in the studied sample

Logistic regression analysis was conducted to identify possible independent predictors in the perception of QOL and satisfaction with health defined by the groups G1 and G2. Table 4 shows the results of the final model with the respective odds ratios (OR) and 95% confidence intervals (CI). The age groups 70 to 79 years (OR: 2.24; 95% CI: 1.19 to 4.22) and ≥ 80 years (OR: 3.90; 95% CI: 1.21 to 12.58); place of birth (interior of the state of Minas Gerais; OR: 0.47; 95% CI: 0.24 to 0.92); frequency of physical activity 1-3 times per week (OR: 3.42; 95% CI: 1.25 to 9.42) and 4-7 times per week (OR: 7.67; 95% CI: 2.43 to 24.25); diabetes (OR: 0.49; 95% CI: 0.24 to 0.98); musculoskeletal disorders (OR: 0.49; 95% CI: 0.24 to 0.97); arterial hypertension (OR: 0.38; 95% CI: 0.19 to 0.74) and PHQ ≥ 3 (OR: 0.12; 95% CI:

0.04 to 0.33) remained independently associated with QOL and satisfaction with health after multivariate analysis of the data. The independent variables explained 20.47% (Pseudo R<sup>2</sup> = 0.2047) of the response variable (good QOL and satisfaction with health). The results of the adjustment tests of the multiple logistic regression models (Hosmer and Lemeshow) showed a good fit for the final model (Prob > chi<sup>2</sup> = 0.5722).

#### Discussion

This study showed a positive relationship between QOL with advancing age and physical activity. Furthermore, a negative association was found between QOL, being born in the state of Minas Gerais and comorbidities (diabetes, musculoskeletal diseases, hypertension and depression). These findings confirmed the multifactorial nature of the studied phenomenon, i.e. QOL was influenced by demographic factors as well as clinical and behavioral factors.

Older age was associated with a better perception of QOL, which was consistent with a previous study. This finding may indicate that

**Table 4.** Final logistic regression model with good quality of life and satisfaction with health as the dependent variable at a Reference Center for the Elderly, Belo Horizonte, Minas Gerais, Brazil from 2012 to 2014 (n = 257)

Variable	OR	CI (95%)	p-value
Age group(years)			
60-69	1.00 (ref.)		
70-79	2.24	1.19-4.22	<b>0.012</b>
≥ 80	3.90	1.21-12.58	<b>0.023</b>
Place of birth			
BH or RMBH	1.00 (ref.)		
Interior of MG	0.47	0.24-0.92	<b>0.027</b>
Other	0.95	0.27-3.36	0.934
Frequency of physical activity			
Never	1.00 (ref.)		
1-3 times per week	3.42	1.25-9.42	<b>0.017</b>
4-7 times per week	7.67	2.43-24.25	<b>0.001</b>
Diabetes			
No	1.00 (ref.)		
Yes	0.49	0.24-0.98	<b>0.044</b>
Musculoskeletal diseases			
No	1.00 (ref.)		
Yes	0.49	0.24-0.97	<b>0.042</b>
Arterial hypertension			
No	1.00 (ref.)		
Yes	0.38	0.19-0.74	<b>0.005</b>
PHQ-2 total			
< 3	1.00 (ref.)		
≥ 3	0.12	0.04-0.33	<b>&lt; 0.001</b>

BH - Belo Horizonte; CI 95% - 95% confidence interval; MG - Minas Gerais; OR - Odds ratio; PHQ - The Patient Health Questionnaire; MRBH -Metropolitan region of Belo Horizonte.

the “older elderly” conformed to the inevitability of old age, while the “younger elderly” were faced by the dilemma of aging and presented such a condition<sup>22</sup>. This can provide fruitful discussion about how the perceptions of aging, working and resilience of this sector of elderly people were reflected in higher scores in relation to QOL.

Regarding behavioral habits, a study involving 115 elderly women and 61 elderly men from the Palestinian West Bank (average age 68.15 ± 6.74 years) showed a strong association between higher levels of physical activity and a positive influence on all dimensions of QOL related to health<sup>31</sup>. In the present study, a direct and gradual relationship was also observed between the frequency of physical activity and the score for QOL. It is known that physical exercise, if performed regularly and properly, slows functional losses and provides elderly people with autonomy and a better QOL. Therefore, physical activity programs for the elderly should be directed towards the development of physical and functional improvements, as well

as teaching people the limitations and aptitudes of their body<sup>32</sup>. However, a recent study conducted in Brazil, with a population-based sample of elderly people, indicated a prevalence of physical inactivity of 46.7%, mainly in octogenarians<sup>33</sup>. In this regard, encouraging healthy habits and behavior should be discussed in government programs in order to contribute to active and healthy aging, with minimal incapacities.

One of the most worrying factors regarding the elderly is their overall health and the issue of morbidities is of fundamental importance. Thus, health prevention and promotion can impede functional decline and offer a better quality of life for elderly people<sup>34</sup>.

However, the aging process is not necessarily related to disease and disability: chronic degenerative diseases are often found among the elderly. Thus, the current trend is that there are an increasing number of elderly individuals who, despite living longer, have higher levels of chronic conditions. The increase in the number of chron-



ic diseases is directly related to greater functional disability<sup>35</sup>. Brazilian and international studies have demonstrated significant associations between chronic diseases, functional disability and the QOL of the elderly<sup>35-37</sup>.

In relation to the overall scores for the WHO-QOL-BREF domains, the environmental domain obtained extremely low scores, which negatively influenced the QOL. This particular domain refers to aspects such as physical safety and security, health and social care (availability and quality), opportunities to acquire new information and skills, participation and opportunities for recreation/leisure, etc.

A study conducted in metropolitan areas of Brazil between 1991 and 2000 assessed the Quality of Human Life Index (QHLI). The QHLI consists of five indicators (quality of housing, living conditions, income, health and environmental safety, and sanitary services), and it also measures aspects related to human development and the quality of the built environment. According to the results of the aforementioned study, the quality indicators which most influenced a decrease in QHLI in metropolitan areas were quality of housing, health and environmental safety. These aspects are related to a high prevalence of respiratory and parasitic diseases, which are strong instruments of indirect estimates of the quality of air and water enjoyed by the population, as well as mortality from external causes and violence in its broadest sense<sup>38</sup>.

Violence significantly undermines environmental safety and this issue is the subject of much discussion by those who live in urban areas in Brazil. This topic has a fundamental influence on the daily life of individuals, social groups, the media in general, and the relationship between state, society and social organizations in the world and in Brazil. Violence is a complex phenomenon that affects both developed and developing countries. In many societies, various expressions of violence are often treated as a form of acting “normally” and it is hidden within the customs and relationships that exist between people. Both in Brazil and worldwide, violence against older people is expressed in the ways that relationships are organized between the rich and the poor, between genders, races and age groups within the various spheres of public, institutional and family power<sup>39</sup>. Thus, violence against the elderly significantly affects the environment in which they live and interact.

Given the seriousness of this situation, in 2014 the Human Rights Secretariat of the Pres-

idency of the Republic of Brazil published the “Manual to Deal with Violence against the Elderly”. The goal of this manual was to reach a wide audience of people who, by law, must respect, protect and care for the elderly. The latter include managers, service providers, health and social services professionals, law enforcement officers, security officers and their families<sup>40</sup>. In the case of the city of Belo Horizonte, in 2010 the rate of violence against the elderly was 62.75 per 10,000 inhabitants (admissions in the public system of people aged 60 or over from causes related to possible aggression per 10,000 inhabitants in this age group, by place of residence)<sup>41</sup>.

Brazilian elderly people live in daily fear of violence, a lack of medical care and hospitals, and suffer from scarce leisure activities, as well as financial problems caused by the low values of their pensions<sup>18</sup>.

Consequently, it is important to reflect on the possible causes that negatively affect the QOL of the elderly, especially environmental factors, in order to search for possible improvements. Nursing could be incorporated into the ambit of Family Health teams and could be used as an intervention strategy for home visits. This could provide better knowledge about the area of coverage and could result in intersectoral actions to minimize the impact of the environment on the QOL of the elderly.

Moreover, it should be noted that there are other factors that affect the QOL of elderly people, which were not analyzed in this study but which have been examined in other studies. These include the positive link that has been made between higher levels of satisfaction with life and a better self-perception on the part of the elderly in relation to their oral health<sup>42</sup> and the presence of cognitive decline directly affecting the QOL of elderly people with hypertension due to the fact that the latter limits the capacity to perform everyday activities, particularly if this is associated with painful conditions and emotional changes<sup>43</sup>.

It is important to note that there are limitations associated with the present study due to its transversal design and convenience sample. A further limitation was the lack of similar Brazilian national studies regarding reference centers for the elderly, which prevented comparisons being made.

Nevertheless, the results of this study provide important information regarding the predictors that influence the QOL of elderly people and they indicate the need for government investment and action strategies to guarantee improvements in

health promotion and the prevention of disease prevention, as well as improvements in the local infrastructure.

The data presented in this study can be used to direct care strategies for the most vulnerable elderly people, with particular attention to issues that affect the environment.

### **Collaborations**

LCV Miranda was responsible for the design of the original idea of the article, editing, literature review, interpretation of results and data collection. PAB Silva was responsible for writing the article, the literature review, analysis and interpretation of data. SM Soares was responsible for guidance, the structure of the article, and provided a critical review of the content. All the authors participated in the approval of the final version of the manuscript.

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